

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (currently amended) An image processing apparatus provided with a vehicle,
said image processing apparatus comprising:

an image processing part operable to receive images captured by a plurality of cameras shooting surroundings of ~~[[a]]~~ the vehicle and operable to generate a synthetic image using the received images captured by the plurality of cameras, the synthetic image showing including the vehicle and its surroundings arranged in a manner as looked down from a virtual ~~point-of-view~~ viewpoint,

wherein the image processing part changes at least one selected from a position of the virtual viewpoint, a direction of a line of sight, and a focal length of ~~the virtual point of the synthetic image~~ view in accordance with a running state of the vehicle.

2. (currently amended) The image processing apparatus of claim 1,
wherein the image processing part changes at least one selected from a position of the virtual viewpoint, a direction of a line of sight, and a focal length of ~~the virtual point of view~~ synthetic image in accordance with a running speed of the vehicle.

3. (currently amended) The image processing apparatus of claim 1,
wherein the image processing part changes at least one selected from a position of
the virtual viewpoint, a direction of a line of sight, and a focal length of the ~~virtual point of~~
~~view~~ synthetic image, and controls capturing of an image outside a view range of the
changed ~~virtual point of view~~ synthetic image.

4. (currently amended) The image processing apparatus of claim 3,
wherein the image processing part controls the capturing of an image outside a view
range of the changed ~~virtual point of view~~ synthetic image by changing a model for image
synthesis.

5. (currently amended) The image processing apparatus of claim 1
wherein the image processing part changes at least one selected from a position of
the virtual viewpoint, a direction of a line of sight, and a focal length of the ~~virtual point of~~
~~view~~ synthetic image in accordance with a steering angle of the vehicle.

6. (currently amended) The image processing apparatus of claim 1,
wherein the vehicle includes an object detecting sensor operable to detect an
obstacle, and
the image processing part changes at least one of selected from a position of the
virtual viewpoint, a direction of a line of sight, and a focal length of the ~~virtual point of view~~
synthetic image in accordance with results of detection by the object detecting sensor.

7. (currently amended) The image processing apparatus of claim 1, wherein the image processing part includes an original mapping table and generates a synthetic image using a mapping table that is cut out from the original mapping table, and

the image processing part changes at least one selected from a position of the virtual viewpoint, a direction of a line of sight, and a focal length of the virtual point of view synthetic image by changing the mapping table to be cut out from the original mapping table.

8. (currently amended) An image processing apparatus provided with a vehicle, said image processing apparatus comprising:

an image processing part operable to receive images captured by a plurality of cameras shooting surroundings of ~~[[a]]~~ the vehicle and operable to generate a synthetic image using the received images captured by the plurality of cameras, the synthetic image ~~showing~~ including the vehicle and its surroundings arranged in a manner as looked down from a virtual point of view viewpoint,

wherein the image processing part controls capturing of an image outside a view range of the ~~virtual point of view~~ synthetic image in accordance with a running state of the vehicle.

9. (currently amended) A monitoring system provided with a vehicle,
said monitoring system comprising:
a plurality of cameras operable to shoot surroundings of ~~[[a]]~~ the vehicle;
an image processing part operable to receive images captured by the plurality of
cameras and operable to generate a synthetic image using the received images captured
by the plurality of cameras, the synthetic image ~~showing~~ including the vehicle and its
surroundings arranged in a manner as looked down from a virtual ~~point of view~~ viewpoint;
and
a display part operable to display the synthetic image,
wherein the image processing part changes at least one selected from a position of
the virtual viewpoint, a direction of a line of sight, and a focal length of the synthetic image
~~of the virtual point of view~~ in accordance with a running state of the vehicle.

10. (currently amended) An image processing apparatus provided with a vehicle,
said image processing apparatus comprising:
an image processing part operable to receive images captured by a plurality of
cameras shooting surroundings of ~~[[a]]~~ the vehicle and operable to generate a synthetic
image using the received images captured by the plurality of cameras,
wherein the image processing part generates an image including a first image and a
second image as the synthetic image,
the first image ~~showing~~ including the vehicle and its surroundings arranged in a
manner as looked down from a virtual ~~point of view~~ viewpoint,

the second image being viewed from a viewpoint that is different from the virtual point-of-view viewpoint of the first image in at least one selected from a position of the virtual viewpoint, a direction of a line of sight and a focal length of the synthetic image, or the second image being different from the first image in a model.

11. (original) The image processing apparatus of claim 10,
wherein the second image is at least one of the camera images.

12. (original) The image processing apparatus of claim 10,
wherein the first image is a close view image showing the vehicle and surroundings thereof, and

the second image is a distant view image showing an area distant from the surrounding area of the vehicle that is shown by the close view image.

13. (original) The image processing apparatus of claim 12,
wherein the image processing part arranges the distant view image around the close view image in the synthetic image.

14. (original) The image processing apparatus of claim 13,
wherein the distant view image is an image having continuity with the close view image.

15. (original) The image processing apparatus of claim 10, wherein
the first image shows at least a part of the vehicle and at least a part of the
surroundings of the vehicle, and
the second image is obtained by enlarging at least a part of the region shown by the
first image.

16. (currently amended) A monitoring system provided with a vehicle,
said monitoring system comprising:
a plurality of cameras operable to shoot surroundings of ~~[[a]]~~ the vehicle;
an image processing part operable to receive images captured by the plurality of
cameras to generate a synthetic image using the received images captured by the plurality
of cameras; and
a display part operable to display the synthetic image,
wherein the image processing part generates an image including a first image and a
second image as the synthetic image,
the first image ~~showing~~ including the vehicle and its surroundings arranged in a
manner as looked down from a virtual point-of-view viewpoint,
the second image being viewed from a viewpoint that is different from the virtual
~~point-of-view~~ viewpoint of the first image in at least one selected from a position of the
virtual viewpoint, a direction of a line of sight and a focal length of the synthetic image, or
the second image being different from the first image in a model.

17. (currently amended) An image processing apparatus provided with a vehicle, said image processing apparatus comprising:

an image processing part operable to receive images captured by a plurality of cameras shooting surroundings of ~~[[a]]~~ the vehicle and operable to generate a synthetic image using the received images captured by the plurality of cameras, the synthetic image ~~showing~~ including the vehicle and its surroundings arranged in a manner as looked down from a virtual ~~point-of-view~~ viewpoint,

wherein in the synthetic image, the image processing part displays at least a part of a vehicle region where the vehicle is present, and an attention drawing region for drawing attention in which at least a part of the surroundings of the vehicle is shown and which corresponds to at least a part of a blind spot region around the vehicle that is not shot by any of the cameras.

18. (currently amended) The image processing apparatus of claim 17, wherein the virtual point-of-view viewpoint is set above the vehicle.

19. (original) The image processing apparatus of claim 17,
wherein the image processing part displays an illustration image or an actual image of the vehicle on the vehicle region.

20-21. (cancelled)

22. (previously presented) The image processing apparatus of claim 17,
wherein the image processing part determines a range of a region obtained by
combining the blind spot region and the vehicle region, using region data showing a
projection region of the vehicle in each camera image.

23. (currently amended) A monitoring system provided with a vehicle,
said image processing apparatus comprising:
a plurality of cameras operable to shoot surroundings of ~~[[a]]~~ the vehicle;
an image processing part operable to receive images captured by the plurality of
cameras and operable to generate a synthetic image using the received images captured
by the plurality of cameras, the synthetic image ~~showing~~ including the vehicle and its
surroundings arranged in a manner as looked down from a virtual point-of-view viewpoint;
and
a display part operable to display the synthetic image,
wherein in the synthetic image, the image processing part displays at least a part of
a vehicle region where the vehicle is present, and an attention drawing region for drawing
attention in which at least a part of the surroundings of the vehicle is shown and which
corresponds to at least a part of a blind spot region around the vehicle that is not shot by
any of the cameras.

24. (currently amended) An image processing apparatus provided with a vehicle,

said image processing apparatus comprising:

an image processing part operable to receive images captured by a plurality of cameras shooting surroundings of ~~[[a]]~~ the vehicle and operable to generate a synthetic image using the received images captured by the plurality of cameras, the synthetic image ~~showing~~ including the vehicle and its surroundings arranged in a manner as looked down from a virtual ~~point-of-view~~ viewpoint,

wherein the image processing part generates the synthetic image, using a mapping table including first mapping data describing a relationship between pixels of the synthetic image and pixels of the camera images, and second mapping data describing an identifier showing that a pixel of the synthetic image corresponds to pixel data other than the camera images, and

wherein the pixel data other than the camera images show the vehicle or a blind spot region that is present in at least a part of the surroundings of the vehicle.

25. (cancelled)

26. (original) The image processing apparatus of claim 24,

wherein the image processing part stores a predetermined image other than the camera images, and

with respect to the pixel of the synthetic image, the second mapping data describe coordinate values corresponding to the pixel in the stored predetermined image.

27. (original) The image processing apparatus of claim 24,
wherein the second mapping data describe pixel data corresponding to the pixel of
the synthetic image.

28. (currently amended) An image processing apparatus provided with a vehicle,
said image processing apparatus comprising:

an image processing part operable to receive images captured by a plurality of
cameras shooting surroundings of ~~[[a]]~~ the vehicle and operable to generate a synthetic
image using the received images captured by the plurality of cameras, the synthetic image
~~showing~~ including the vehicle and its surroundings arranged in a manner as looked down
from a virtual ~~point of view~~ viewpoint,

wherein the image processing part uses mapping data describing a relationship
between pixels of the synthetic image and a plurality of pixel data including one or both of
pixel data of the camera images and pixel data other than the camera images, and
describing a rate of necessity with respect to each of the pixel data, and weights each pixel
data in accordance with the rate of necessity,

thereby generating the pixel data of the pixels of the synthetic image.

29. (currently amended) An image processing apparatus provided with a vehicle,
said image processing apparatus comprising:

an image processing part operable to receive images captured by a plurality of cameras shooting surroundings of ~~[[a]]~~ the vehicle and operable to generate a synthetic image using the received images captured by the plurality of cameras, the synthetic image ~~showing~~ including the vehicle and its surroundings arranged in a manner as looked down from a virtual ~~point of view~~ viewpoint,

wherein the image processing part includes an original mapping table, cuts out a mapping table describing a correspondence relationship between pixels of the synthetic image and pixels of the camera images, and generates the synthetic image, using the cut-out mapping table.

30-31. (cancelled)

32. (currently amended) The image processing apparatus of claim 1, wherein the virtual ~~point of view~~ viewpoint is set outside of the vehicle.

33. (currently amended) The image processing apparatus of claim 1, wherein the virtual ~~point of view~~ viewpoint is set above the vehicle.

34. (currently amended) The image processing apparatus of claim 17, wherein the virtual ~~point of view~~ viewpoint is set outside of the vehicle.

35. (new) The image processing apparatus according to claim 1, wherein the synthetic image including a roof shape of the vehicle.

36. (new) The image processing apparatus according to claim 1, wherein the synthetic image including a whole shape of the vehicle.

37. (new) The image processing apparatus according to claim 1, wherein the image processing part changes the position of the virtual viewpoint in vertical direction.

38. (new) The image processing apparatus according to claim 1, wherein the image processing part changes the direction of a line of site in pitch angle.